Pacific Insects Monograph 23: 229-233 **September 1970**

LEPIDOPTERA: YPONOMEUTIDAE OF HEARD ISLAND[1]

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Abstract: A single species—*Embryonopsis halticella* Eaton—from Heard I. is reported here.

Only one lepidopteran has been recorded from Heard Island. Brown (1964) described *Pringleophaga heardensis* as new, basing it on a series of adults of both sexes, and on larvae and pupae. Unfortunately, Brown's original description and figures were inadequate for reliable identification of the species, or even for correct family assignment, although several features suggested that his species was not correctly placed in *Pringleophaga*, and was in fact not one of the Tineidae.

Adult and larval material since collected at Heard I. for the Bishop Museum by Mr R. P. Temple has now been examined and the adults compared with the types of *P. heardensis* in the School of Public Health and Tropical Medicine, University of Sydney. They have also been compared with Bishop Museum specimens of *Embryonopsis halticella* Eaton collected at Kerguelen by Temple. It is clear that all of these belong to the one species *E. halticella*, originally described in 1876 from Iles Kerguelen, but recorded more recently from Ile Marion by Viette (1948). *P. heardensis* is thus a junior subjective synonym of *E. halticella.*

Adults of the brachypterous *E. halticella* were redescribed and figured by Viette (1948), and his observations are largely supported by the present study. However, in both the Kerguelen and Heard Island specimens, the ocelli are present, not absent as stated by Viette, and vein R of the forewing is not forked but simple, running to the termen. The genus and species are here redescribed, camera lucida figures of the head, maxilla, wing venation and genitalia given, and the larva is described and figured.

Genus **Embryonopsis** Eaton

Embryonopsis Eat., 1876: 61; 1879: 235.—Viette, 1948: 11.

Type-species: *Embryonopsis halticella* Eaton, by monotypy.

Head (Fig. 1) with appressed scales; ocelli present, joined dorsally by a transverse suture; eyes small, ommatidia prominent, an unscaled area surrounding each eye, broadest above; frontoclypeus rounded; antennae simple, 39–43 segments, scape without pecten, bases of antennae joined by a transverse suture; pilifers present, rounded, with dense bristles; mandibular lobes present, elongate, pointed apically; maxilla (Fig. 2) with haustellum short, coiled, scaleless, showing sclerotized rings, and bearing short hairs and scattered subapical carinate papillae, maxillary palpi 4-segmented, apical segment tapering to rounded apex, equal in length to 2nd and 3rd together, basal segment bearing several setae; labial palpi recurved, with appressed scales, apical segment acute, reaching base of antenna. *Thorax* with metascutum bearing a large patch of medially directed minute spines. *Legs* of moderate length, with appressed scales; fore tibia with epiphysis articulating at 3/5, mid tibia with pair of apical spurs, hind tibia with paired spurs at 2/3 and at apex. *Wings* (Fig. 3) short, lanceolate; forewing without retinaculum in either sex, venation vestigial, reduced to 5 longitudinal nontubular simple veins, Sc, R, M, Cu and A, without defined discal cell, underside of forewing with small oval area of outwardly directed minute spines at anal angle; hindwing only about 3/10 length and breadth of forewing, without frenulum or discernible venation. *Abdomen* with appressed scales, terga with broad, heavily sclerotized central area, without spines, segment 8 in ♂ with a pair of large rounded and flattened lateral processes, each

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[1] Results of fieldwork on South-Indian Ocean Expedition to Heard I.

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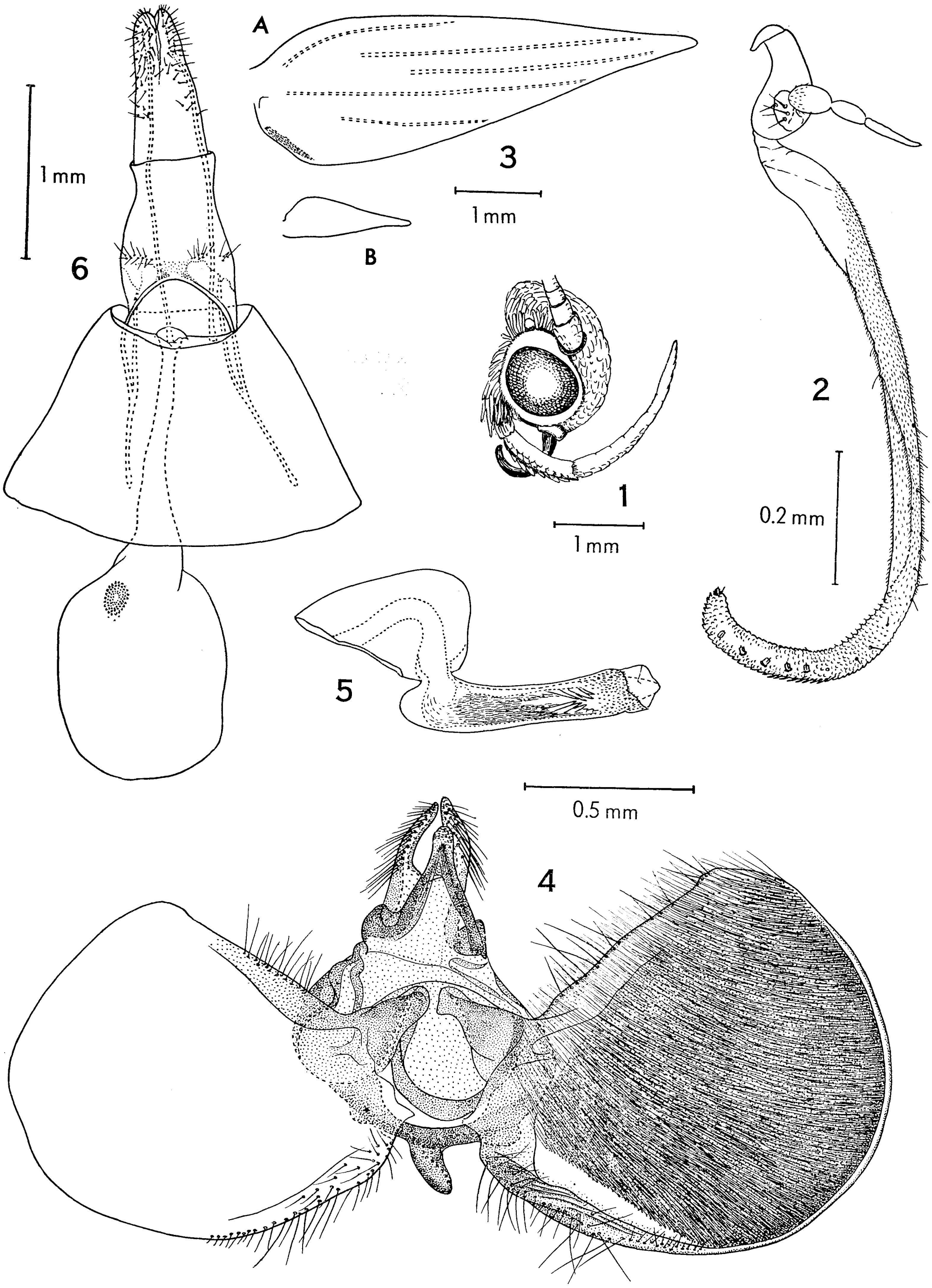

Fig. 1–6. Adults of *Embryonopsis halticella* Eaton. 1, Head, lateral view; 2, maxilla; 3A, forewing, 3B, hindwing; 4, 5, ♂ genitalia; 6, ♀ genitalia.

with an internal elliptical area from which arises a series of long scales.

♂ *genitalia* (Fig. 4, 5) with bifurcate uncus, 2 arms diverging basally and converging apically, anal tube passing through orifice so formed, each arm bearing dense anteriorly directed bristles; gnathos with well sclerotized arms, apically united, with slight area of rugosity at apex; valva very large, rounded, costa slightly sinuate, sacculus small, narrow, costa extended proximally and approaching costal base of other valva; vinculum strongly sclerotized, saccus short but well defined, slender, projecting anteriorly into lumen of abdomen; aedeagus straight, vesica ornamented with many spines of various lengths.

♀ *genitalia* (Fig. 6) with papillae anales tapering distally; apophyses posteriores long, well sclerotized, apophyses anteriores much shorter, with ventral arms fused medially; ostium bursae simple, segment 9 densely spinulose, ductus bursae a simple membranous tube, expanding slightly towards corpus bursae, corpus bursae rounded, signum a broadly oval scobinate area.

Larva (mature) with head (Fig. 10, 11) with adfrontal areas reaching nearly to vertical triangle, 6 ocelli on each side, lines joining setae A2 to A1 and A1 to A3 forming a right angle, puncture Aa posterior to A2, O1 ventral from ocelli II and III and almost equidistant from II, III and IV, O2 posteroventral from ocellus I, Oa ventral from O1 and O2 and about equidistant from each of them, SO2 close to and posterodorsal from SO1, SO3 anterior to ocellus V, with SOa between them, L1 well posterior to ocellus I, La well posterior to L1, P2 lateral and slightly posterior to P1, Pa anterior to P2, Pb equidistant from P1 and P2, but nearer to V1 than to either. Thorax with legs (Fig. 13) normal, 2 apical dorsal setae of tarsi flattened, acute, scale-like; prothorax (Fig. 7) with shield separate from pinnaculum of L group, with MXD1 on its posterior margin, D1 anterodorsal from D2, SD1 anterior to SD2, L group trisetose, setae arranged in a horizontal line, SV group bisetose; meso- and metathorax (Fig. 7) with D1 dorsal from D2, MD1 near anterior margin opposite D2, SD1 ventral from SD2, L1 ventral from SD1, L2 anteroventral from L1 and on same pinnaculum, L3 posterior to L1, SV group unisetose.

Abdomen (Fig. 7, 8, 9) with ventral prolegs present on segments 3–6, of normal length, with 8–12 crochets (Fig. 12) on each, arranged in a uniordinal penellipse, with lateral gap large; segment 8 with D2 slightly more dorsal than D1, segments 1–8 with SD2 minute, anteroventral from SD1 and on separate pinnaculum, on 1–7 SD2 anterodorsal from spiracle, and on 8 anteroventral from spiracle, segments 1–8 with L1 remote from L2 and each on a separate pinnaculum, L1 posteroventral from spiracle, L2 anteroventral from L1 and slightly anterior to spiracle, L3 ventral from L1 and L2 and slightly anterior to L1, on segments 1–6 SV trisetose, on 7 bisetose, and on 8 unisetose, segment 9 with transverse dorsal strongly sclerotized plate, from which arises D1 and D2, D1 posteroventral from D2, SD1 anterior to and slightly ventral from L2, L2 ventral from D1, L1 ventral from and slightly anterior to L2, SV group unisetose, well ventral from L1.

Embryonopsis halticella Eaton

Embryonopsis halticella Eat., 1876: 61; 1879: 236.—Viette 1948: 16.
Pringleophaga heardensis Brown, 1964: 34. **New Synonymy.**

Types. There are 6 syntypic specimens of *E. halticella* in the British Museum (Nat. Hist.) labeled "H. 24: 23-XI.74.AE", 1 ♂ of which has been dissected by Dr J. F. Gates Clarke (slide number 6025). The types of *P. heardensis* are in the School of Public Health and Tropical Medicine, Sydney. A ♂ is labeled "Heard Isl., 10.1.52, K. G. Brown" and "Pringleophaga heardensis, Idt. K. G. Brown ♂" (the latter on white paper with a red margin). However, the pinned substaged ♂ specimen so labeled has the abdomen and genitalia intact, yet the stage pin carries a rectangular celluloid mount of the ♂ genitalia of another specimen. In addition to these specimens, there is a pinned, substaged ♀ specimen bearing 2 labels, the first similar to the collection data label of the ♂, and the second "Pringleophaga heardensis Brown, Type ♀" (on red paper). I therefore, hereby designate the ♂ pinned specimen with intact abdomen as the Lectotype. I have attached the celluloid mount of the separate ♂ genitalia to a separate pin and given it a data label similar to the lectotype. Both this mount and the ♀ specimen I have labelled paralectotypes.

♂. Head, palpi, scape and pedicel of antennae, thorax, legs, wings and abdomen clothed with

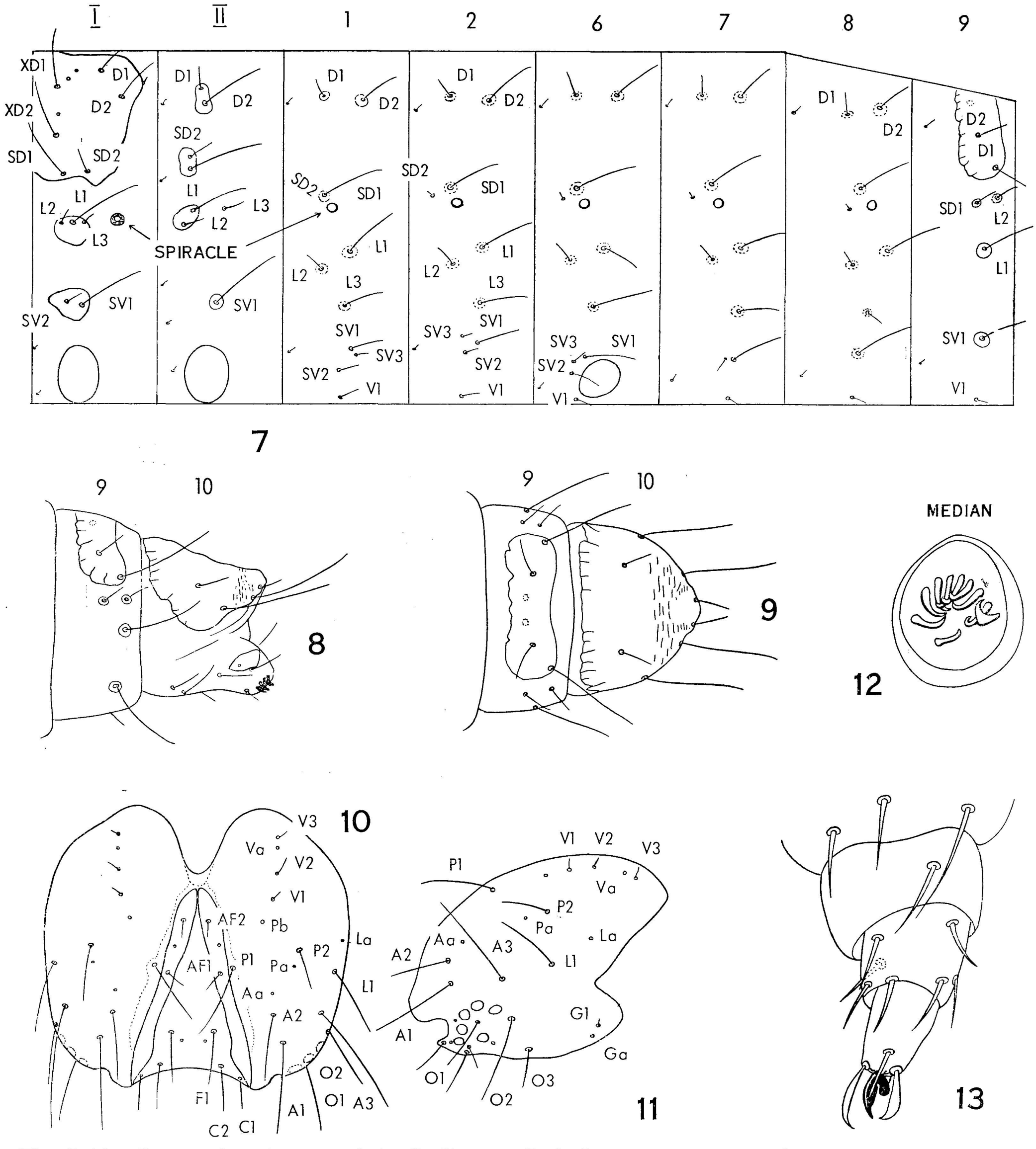

Fig. 7–13. Larva of *Embryonopsis halticella* Eaton. 7, 8, 9, Chaetotaxy of body; 10, 11, chaetotaxy of head; 12, crochets; 13, thoracic leg.

appressed grayish-brown scales, those on processes of 8th abdominal segment and on valvae ochreous brown; flagellum of antenna practically unscaled, but densely setose.

♀. Similar to ♂, but flagellum of antenna with shorter setae.

Comments. Eaton (1875) originally referred to this species as one of the Gelechiidae, but with some degree of doubt. He based this upon the form of the recurved and apically acute labial palpi. He later (1879) stated more confidently that *Embryonopsis* was closely related to the Gelechiidae because of the smooth-scaled head, the form of the labial palpi, and the larva, although he considered that the abbreviated wings, together with the lateral processes of the 8th abdominal segment and the large rounded valvae in the ♂, distinguished it from other genera of that family. Viette (1948) traced the subsequent family history of the genus, pointing out that several authors including Enderlein (1905) followed Eaton in assigning it to the Gelechiidae, the last having erected a new subfamily Embryonopsinae for it. Viette (1948), however, referred *Embryonopsis* to the Yponomeutidae, basing his conclusion mainly on the form of the ♂ genitalia, with saccus and bifid uncus, and the presence of the paired lateral abdominal processes of the ♂.

A position for *Embryonopsis* in the Yponomeutidae *sensu lato* seems logical, not only on genitalic structure, but on other characters of the adult and larva. In the Gelechioidea the base of the haustellum is invariably clothed with overlapping scales, and when the maxillary palpi are 4-segmented, as they are in most gelechioids, they are folded over the base of the haustellum. *Embryonopsis* has an unscaled haustellum and the 4-segmented maxillary palpi do not fold over its base. Likewise, the mandibular lobes present in *Embryonopsis* are present in *Plutella* of the Yponomeutidae and in *Glyphipterix* in the Glyphipterigidae. Ocelli are also present in *Embryonopsis*, as in *Plutella* and *Glyphipterix*, but are not as prominent as in the latter.

The present study of the larva of *Embryonopsis* indicates it belongs in the Yponomeutidae rather than in the Glyphipterigidae. Of special note are the abdominal setae of the L group, where L1 and L2 are remote from one another and arise from separate pinnacula.

The ♂ genitalia, with bifid uncus, large rounded simple valvae, with anteriorly directed basal costal projections which almost meet medially when the valvae are extended laterally, and the small but well-developed saccus, together with the lateral abdominal processes of the ♂, are all characteristic of the Yponomeutidae. In addition, the structure of the ♀ genitalia is not inconsistent with that of the Yponomeutidae.

Brown (1964) stated that at Heard Island the larvae fed on the grass *Poa*, eating the lower leaves and roots. He had difficulty therefore in reconciling the grass-feeding habits of his species with those of *Pringleophaga kerguelensis*, which had been reported feeding on several dicotyledonous plants including *Pringlea*. However, Eaton (1875) had recorded that at Kerguelen *Embryonopsis halticella* fed on grasses and later (1879) stated that they fed on *Festuca cookii* and *F. erecta*, sheltering in the ensheathing leaves and in the shoots.

Acknowledgements: Thanks are due to Prof. D. J. Lee of the School of Public Health and Tropical Medicine, Sydney, who made the types of *Pringleophaga heardensis* available for study; to Mr P. E. S. Whalley of the British Museum (Nat. His.) for information about Eaton's types, and to Dr J. L. Gressitt of the B. P. Bishop Museum, Honolulu, for loaning material of *Embryonopsis*.

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